Hypergolic Maintenance Facility (HMF)

Installation & Test Plan - Initial Configuration

Checkout and Launch Control System (CLCS)

84K00054-001

Prepared by:

Original Signed By	*12/12/1997*
G.E. Neff - CLCS/LM	Date
Original Signed By	*12/12/1997*
Greg Clements - CLCS/NASA	Date

Approval:

Original Signed By	*12/12/1997*
Chief, CLCS Project Control Office	Date
Original Signed By	*12/12/1997*
Dennis Fougnie - CLCS/NASA	Date

NOTE: See "**Supporting Document Note**" on following page

PREPARED BY: G. E. Neff, Sr. Computer Systems Engineer, LM

Supporting Document Note: Acronyms and definitions of many common CLCS terms may be found in the following documents: CLCS Acronyms 84K00240 and CLCS Project Glossary 84K00250.

REVISION HISTORY

REV	DESCRIPTION	DATE

LIST OF EFFECTIVE PAGES				
Dates of issue of change pages are:				
Page No.	**A or D***	**Issue or Change No.**	**CR No.**	**Effective Date****

1. INTRO

1.1 STATEMENT OF PURPOSE

The purpose of this document is to establish the Installation & Test Plan for the initial configuration of the Checkout and Launch Control System (CLCS) Hypergolic Maintenance Facility (HMF) equipment set. This document shall provide a installation schedule, equipment lists, hardware installation layouts, and Installation Team assignments prior to the commencement of equipment installation.

1.2 SCOPE

The scope of this document is to include all installation planning efforts for the Initial HMF Development Set. An installation upgrade to a final "Production Set" of equipment (with production hardware and console enclosures) will take place at a later scheduled date. The installation of the upgrade is NOT in the scope of this document.

1.3 APPLICABLE DOCUMENTS

The following documents provide reference material related to the Hypergolic Maintenance Facility (HMF) installation plan:

Concept of Operations (ConOps), Checkout and Launch Control System (CLCS), 84K00220, Revision - PreRelease-2, 11/12/97

Modifications to Bldg. M7-1061, CLCS Control Room, 79K35116, Oct. 29, 1997

1.4 OVERVIEW - HYPERGOLIC MAINTENANCE FACILITY

The Hypergolic Maintenance Facility (HMF) is located in the KSC Industrial Area, building M7-1061.

The HMF is used to perform repairs and checkout on the OMS Pods and FRCS Modules. The pods and modules undergo major refurbishment at the HMF while the associate orbiter is in its maintenance down period. The HMF also repairs failed OMS/RCS pods or modules that are removed from the orbiter.

An existing equipment set of the Checkout, Control and Monitor Subsystem (CCMS) currently is used to perform these testing operations. This HMF equipment set supports all three test cells simultaneously with up to five parallel tests. The HMF set also supports software debug and verification against the simulation system.

2. INSTA

The HMF Hardware Installation Schedule is shown and can be referenced in the Appendices. The schedule indicates start dates, completion dates and major milestones for the various steps of the HMF installation.

3. INSTA

3.1 INITIAL EQUIPMENT INSTALLATION

A CLCS equipment set (which will be a functional replacement for the existing CCMS HMF set) will be installed during the 1998 calendar year. An initial installation (with 'pre-production' hardware and tables in place of console enclosures) will take place during the Initial HMF Installation as per the referenced schedule. This initial configuration CLCS HMF Equipment Set shall be a "Development Set" of equipment which will be used for preliminary software development and debug activities that can take place without production hardware.

3.2 HMF INSTALLATION TEAM

Since this is the first equipment set installation of CLCS hardware, the initial configuration of the HMF system shall be implemented by a joint team of CLCS engineering and USA installation and technician personnel. In addition, formal, released drawings will not be required for this installation; the joint team will work from engineering sketches, that will be redlined to indicate the 'as-installed' configuration.

In future CLCS equipment installations, the USA Installation Team shall have primary and direct responsibility for performing installation activities, working from released drawings developed by CLCS engineering personnel.

3.3 HMF TEAM RESPONSIBILITIES

The following outlines the current responsibilities for the members of the joint HMF installation team as of the published date of this document:

- HMF Set Manager - TBD
- Generation of Equipment List & PR's - Dennis Fougnie, NASA
- Procurement of All Equipment & Software - Project Control Office - Teresa Strobush, NASA
- Facility Modifications, Tom Brauer, NASA
- Staging Lab Lead - Steve Gersten, USA
- Platform & Consoles, Engineering & Installation support of CCWS, DDP/CCP & Consoles - Greg Clement, NASA
- Platform Engineering & Installation Support - G. Neff, Lockheed Martin
- Support Network Services, Engineering & Installation Support of BIN servers & BIN Network - Glenn Seaton, NASA
- Network Services, installation of DCN, RTCN network equipment - John Porter, NASA
  - Network Engineering & Installation Support, Jim McMahon, Lockheed-Martin
  - Configuration Management & Installation Support, Don Spade, Dynacs
- Gateways, installation of gateway equipment - Shawn Quinn, NASA
- Simulation Gateway, installation of gateway SIM W/S - Scott Estes, NASA
- System Services, Operating System Loads - Oscar Brooks, NASA
- Integration & Test, Load SCID/TCID loads & perform System Testing - Robert Sutton, Lockheed Martin
- Installation/Activation Team Lead - Tom Brauer, NASA
  - USA Installation, Generation of Set Installation Drawings & Hardware Installations - Tom Wright, USA
- Operation Television (OTV) - Marie Reed, NASA
- Operation Intercom System (OIS-D) - Jim Sita, USA

3.4

ASSEMBLY HARDWARE INSTALLATION PACKAGE

An Assembly Hardware Installation Package, consisting of all assembly and installation drawings, shall be developed and used for the HMF Installation. These drawings were developed by various members of the HMF Installation Team as engineering sketches. CLCS will perform cursory Configuration Management of these sketches, via the Razor CM Tool.

Production Set drawings, based upon the 'lessons learned' from this initial HMF installation, shall be developed for the HMF Production Set Installation. USA will perform final cleanup on all production assembly and installation drawings prior to their release. Once released, USA is responsible for maintaining the configuration of these drawings.

The HMF Set Manager shall be responsible for providing status of the plan and progress of the installation to the CLCS Project Management office.

The following engineering sketches shall be used for HMF Equipment Assembly & Installation:

Subsystem or Hardware Item	**Drawing Number**
HMF Installation Drawing, which includes:	TBD
Floor Plan	
Floor tile cut outs	
Hardware Block Diagram	
Rack tie down dwg.	
Power Grid Connectivity	
Cable Interconnect Diagram	
Reference Designator Assignments	
CCP/DDP Rack Assembly	84K02700
Gateway Rack 1	84K04902-009
Gateway Rack 2	84K04902-010
Gateway Rack 3	84K04902-019
Business Network Rack	TBD
Network Rack 2	TBD
Safing Manager Rack **	TBD
Test Equipment Rack	TBD
Fiber Optic Terminal Equipment Rack	TBD
System Engineering Consoles 1 - 5 **	84K04505
Console Support Modules 1 - 4 **	84K04515
Peripheral Housings **	84K04530
Data Recording Port **	TBD
SGI O2 Computers Hardware Specification, includes:	84K02502
Command and Control Workstation (CCWS)	
Network Server	
Boot Server	
SGI Origin Computer Hardware Specification, includes:	84K02701
Command and Control Processor	
Data Distribution Processor	

NOTE: Equipment marked with asterisks (**) will not be fully functional for the initial hardware installation.

3.5

HMF SET EQUIPMENT LIST (INITIAL CONFIGURATION)

The following is the HMF equipment list, allocated to a system in the initial installation:

Item	Total Qty Required	Subsystem(s) Where Utilized
SGI 02 Workstation, 180 MHZ R5000SC, 128 MB Memory, 4GB Disk (Model CMNB014ANT180)	7	5 CCWS, 1 Net Server, 1 Boot Server
SGI External 9GB (formatted) Ultra SCSI Disk for 02 Systems (Model CMNB019B)	4	1 Net Server, 3 Boot Server
SGI External 4.0 GB 4mm Digital Audio SCSI Tape Drive for 02 Systems (Model CTD8000E-S)	1	Boot Server
NEC 20.1" Color LCD Flat Panel Monitors (Model LA2031JMW)	10	5 CCWS, 5 BASIS Support WS
SGI 20" Multi-Scan Tilt-Swivel, CRT Monitor for 02 Workstation (Model GDM20E21)	2	1 Net Server, 1 Boot Server
Gateway 2000 Intel 266Mhz PC with Pentium II proc, w/MMX, 64MB DRAM (Model LP MINI TOWER)	11	7 BASIS Support WS, OMI Server, RON Server, NMS for DCN/RTCN, NMS for BIN/Utility Network
Gateway 2000 21" CRT Color Monitor (Model VIVITRON 1100)	6	2 BASIS Support WS, OMI Server, RON Server, NMS for DCN/RTCN, NMS for BIN/Utility
SGI Origin2000 DS Server, 4XR 10000, 1 MB Cache, 128MB Mem, 4.5 GB Disk (Model CMNA015)	3	2 DDP, 1 CCP
SGI Tower Origin Vault, SE Interface, Expansion Storage Unit (Model PSVAULTDFDS)	2	2 DDP
Front End Processor (FEP) Chassis, Harris Corp. (P/N 83K01327)	5	Gateway
WYSE Monochrome Monitor (P/N WY185)	3	2 DDP, 1 CCP
BayNetworks FDDI Concentrator, dual attached dual homed (P/N 2914-04)	2	DCN "A" and DCN "B"
BayNetworks 100baseT Switch (P/N 350T)	4	RTCN, Utility Network
Datability Com Server (P/N VCP1000)	1	Gateway
CPU monitor Switch - (Raritian MCP4)	1	BIN
SGI Challenge DM Computer (P/N CMN-A011)	1	Data Recording Port
HP LaserJet Printer 5SiMX, with 4 MB Memory Upgrade SIMM (Model C3167A)	1	Peripheral Housing
Bit 3 PCI 8-Slot Rack Mount Expansion Enclosure, (Model 21-700-2-2)	1	Boot Server
Datum Inc. Network Time Server (P/N TS 2100-IRIG)	1	NTP Server
Cicso Network Switch (Model 2926)	2	BIN
NetBuilder Network Router (Model II/4)	1	BIN
Sun Ultra II Workstation (Model 600-4266-01)	1	Simulation Gateway Host
Sun 21" Color Monitor (Model 3651335-01)	1	Simulation Gateway Host
Heurikon Baja Single Board Computer (Model 4700E)	1	SIM Gateway
TrueTime IRIG-B Card	1	GSC Gateway
Motorola PowerPC Single Board Computers, GCP and SIB (Model MVME-2601)	5	Motorola PowerPC Single Board Computers (GCP and SIB) MVME-2601

3.6 HMF CONSOLES

Production Console Enclosures will not be available for the Initial HMF Installation. Hence, for the initial HMF Installation, GSA tables will be installed in each location where a System Engineering Console or Console Support Module is to be eventually installed. The tables will be used to house the workstations and other equipment allotted to the consoles.

Production Console Enclosures will be installed in the HMF as per Production Set Installation (H/W Update release G2), referenced in the HMF Schedule.

3.7 FACILITY MODIFICATIONS

Prior to the start of the equipment installation, facility modifications (on going at the HMF) will need to be completed. The completion of the HMF Facility Modifications is referenced in the HMF Schedule.

To prevent the HMF Installation Team from impacting the HMF Facility Modification team (and vise versa), the following items will have to be completed (and certified by the KSC HMF facility design team) prior to any HMF set installation activities:

a. The room sizes are as expected.
b. The doors and their openings are as expected, with all obstructions eliminated.
c. The AC power is available and the proper outlets are placed where expected.
d. That there are no obstructions preventing proper underfloor cabling installation.
e. The floor pattern and crossovers to other rooms etc. are as expected.
f. Cut floor tile cutouts are placed as per installation requirements.
g. Ceiling tile work is completed.
h. Fire detectors, wall mounted fire extinguishers and wall mounted safety kits installed.
i. The air conditioning and air handler systems are operational.
j. All painting and trim work is completed.

In addition, the following external interface cable installations into the HMF are required prior to the start of the HMF equipment installation:

a. IRIG-B
b. Launch Data Bus
c. CCMS PCGOAL
d. OC-3 VPS to LCC/SDC

1.

4. HMF I

4.1 LOCATION

The HMF is located in the KSC Industrial Area, building M7-1061. Room 105 is designated as the Computer area, while 105A & 105B is designated as Equipment areas. Room 120 shall be designated as the O & M area .

Refer to Figure 3.1, HMF Development Set Layout, for reference.

4.2 COMPUTER ROOM

The Computer room shall initially have the “Console Tables” of size 30” x 60”. Each table installed in lieu of a System Engineering Console will contain a Command and Control Workstation (CCWS) and a BASIS Support Workstation. Two of the console tables installed in lieu of Console Support Modules shall each contain a BASIS Support Workstation; the other two tables will be left empty.

In summary, there are 5 CCWS and 7 BASIS Support Workstations installed in the computer room.

4.3 EQUIPMENT ROOM

The equipment room shall have a mix of rack mounted hardware and desk-top workstations placed on tables. The following are rack mounted equipment installed in the equipment room:

CCP/DDP Rack
Gateway Rack 1
Gateway Rack 2
Gateway Rack 3
Business Network Rack
Network Rack 2
Safing Manager Rack
Test Equipment Rack
Fiber Optic Terminal Equipment Rack

The following outlines the various desk-top workstations installed in the equipment room:

- Boot/CM and Net servers - Silcon Graphics 02
- Gateway and Gateway SIM workstation - SUN Microsystems Ultra II
- OMI - Intel Gateway 2000
- RON - Intel Gateway 2000
- DRP - Silcon Graphics Challenge DM
- Net DCN/RTCN - Intel NT Workstation, (vendor TBD)

4.4 OFFICE ROOM

Room 120 is designated for office space for Operations and Maintenance (O&M) personnel. The OIS-D End Instrument and one monitor is placed in the room, along with 3 desks, 3 bookcases and 2 cabinets.

Other office environment equipment may be installed at a later date.

4.5 UTILITY ROOM

The Utility Room is where the HMF facility power equipment is located. The following items will be installed as part of the HMF Facility modification effort:

- Power Distribution Unit
- Battery Backup
- Un-Interruptable Power Source

5. INSTA

In order to affect a smooth installation, it is necessary to plan the sequence of each step required for the installation. These steps are for a guide only, and do not necessarily mandate the exact steps that will be taken at the time of installation.

The following steps are planned for the HMF installation:

1. Install under floor cabling.
2. Install racked equipment.
3. Install Console tables.
4. Install rack and console tie downs.
5. Install Misc. tables, desks and bookcases.
6. Install Console Table Workstations and PC's
7. Install all peripheral equipment.
8. Connect all I/F cables.
9. Connect all power cables.
10. Power up and perform power on tests for all equipment.
11. Load OS software with Redstone 1.1.
12. Install IP address's.
13. Perform Hardware Installation Tests
14. Perform Network Testing
15. Load Workstations with SCID/TCID baseline.
16. Perform System Testing

NOTE: OTV, OIS-D and Telephone equipment installations shall be performed in parallel with all computer equipment installations as required.

Appendix A HMF Installation Schedule

Appendix B HMF Floor Plan (Initial Development Set)